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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/598,082

11/27/2006

Masahito Osawa

P30537

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7055 7590 01/15/2010  
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EXAMINER

FOGARTY, CAITLIN ANNE

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

01/15/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com  
pto@gbpatent.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/598,082	<b>Applicant(s)</b> OSAWA ET AL.	
	<b>Examiner</b> CAITLIN FOGARTY	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                     |                                                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                         | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 9, 2009 has been entered.

### ***Status of Claims***

2. Claims 1 – 20 are pending where claim 1 has been amended and claims 6 – 20 are new.

### ***Status of Previous Rejections***

3. The 35 U.S.C. 102(b) rejection of claim 1 as being anticipated by JP 2001-226722 has been maintained.

The 35 U.S.C. 103(a) rejection of claims 2 – 5 as being unpatentable over JP 2001-226722 has been maintained.

### ***Priority***

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 102***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by JP 2001-226722 from the IDS (hereinafter JP '722).

With respect to instant claim 1, [0016], [0019] and [0027]-[0030] of JP '722 disclose a method of producing a Mg-REM-Ni based hydrogen-absorbing alloy. The first step of the method is melting a rare earth element starting material having a low evaporation pressure (such as La, Ce, Pr, Nd, and Y) and a nickel starting material in a melting furnace to obtain a melt of REM-Ni alloy. The second step of the method is to add a magnesium starting material to the melt of REM-Ni alloy to obtain a melt of Mg-REM-Ni alloy. The magnesium starting material of JP '722 is REM-Mg which comprises Mg as recited in instant claim 1. Finally, the third step of the method is to cool and solidify the melt of Mg-REM-Ni alloy at a given cooling rate. Although JP '722 does not specifically teach that during the second step the pressure inside the melting furnace is kept at a given level to obtain a melt of Mg-REM-Ni alloy it would be an inherent feature of the method of JP '722 since the furnace is maintained in a vacuum state and the elements are maintained in the melted state.

***Claim Rejections - 35 USC § 103***

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 2 – 8 and 16 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2001-226722 from the IDS (hereinafter JP '722).

JP '722 is applied to instant claim 1 as discussed above.

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In regards to instant claim 2, JP '722 does not specifically teach the temperature of the melt of the REM-Ni alloy at the addition of the magnesium starting material at the second step. However, it would have been obvious to one of ordinary skill in the art that the temperature of the melt of the REM-Ni alloy at the addition of Mg starting material at the second step would be similar to the claimed range in order to maintain the melted state of the REM-Ni alloy as disclosed in JP '722 since the melting point of La, for example, is 921°C and the melting point of Ni is 1450°C.

Regarding instant claims 3 and 5, [0027]-[0030] and [0040] of JP '722 teach that the furnace is maintained in a vacuum state. Therefore, it would have been obvious to one of ordinary skill in the art to maintain the pressure of the furnace at a pressure similar to that recited in instant claims 3 and 5 in order to maintain the vacuum state.

With respect to instant claim 4, [0027]-[0030] of JP '722 disclose that the cooling rate in the cooling and solidifying of the melt of Mg-REM-Ni alloy in the third step is not less than 100°C/sec which overlaps with the range recited in the instant claim which is a prima facie case of obviousness. See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed cooling range from the cooling range disclosed by JP '722 because JP '722 teaches the same utility (i.e. a method of producing a Mg-REM-Ni based hydrogen absorbing alloy) in the whole disclosed range.

In regards to instant claims 6 – 8, JP '722 does not specifically teach that the pressure inside the melting furnace after the addition of the magnesium starting material is kept at a pressure of 350-500 Torr. However, [0027]-[0033] of JP '722 teach that the

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furnace is maintained in a vacuum state. Then, argon gas is introduced into the furnace in order to control evaporation of Mg. JP '722 teaches that an argon pressure of 0.1 MPa (750 Torr) is preferred. However, the pressure inside the melting furnace after the addition of the magnesium starting material is a result effective variable in terms of controlling the evaporation of Mg. Therefore, it would have been obvious to one of ordinary skill in the art to optimize the pressure inside the melting furnace after the addition of the magnesium starting material through routine experimentation in order to control the evaporation of Mg to a desired level. See MPEP 2144.05 II B.

Regarding instant claims 9 – 15, [0006] and [0007] of JP '722 discloses that it is known in the art to use Mg metal as the magnesium starting material. However, JP '722 teaches that it is not preferable to add Mg metal directly to an elevated temperature molten metal because a large amount of Mg will evaporate. Therefore, it would have been obvious to one of ordinary skill in the art to use the known magnesium starting material of Mg in the method of JP '722 with the expectation of a large amount of Mg evaporation. See MPEP 2123 II.

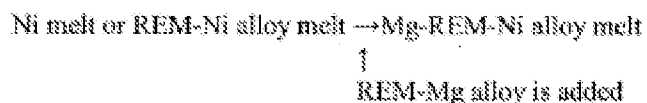
With respect to instant claims 16 – 20, [0006], [0007], and [0016] of JP '722 teach that it is known in the art to use  $\text{Mg}_2\text{Ni}$  as the magnesium starting material. However, JP '722 teaches that it is not preferable to use  $\text{Mg}_2\text{Ni}$  as the magnesium starting material because it has a very high melting point and causes a large amount of Mg to evaporate. Therefore, it would have been obvious to one of ordinary skill in the art to use the known magnesium starting material of  $\text{Mg}_2\text{Ni}$  in the method of JP '722 with the expectation of a large amount of Mg evaporation. See MPEP 2123 II.

***Response to Arguments***

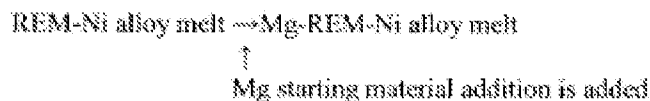
9. Applicant's arguments filed November 9, 2009 have been fully considered but they are not persuasive.

*Arguments are summarized as follows:*

a. The method disclosed by JP '722 is simply illustrated as follows:



To the contrary, the melting method of the present invention, as recited in independent claim 1, is directed to a method of obtaining a Mg-REM-Ni alloy melt by melting a rare earth element starting material and a nickel starting material in a melting furnace to obtain a melt of REM-Ni alloy at a first step, then adding a magnesium starting material comprising Mg or Mg<sub>2</sub>Ni to the melt of REM-Ni alloy at a second step, and at the same time keeping pressure inside the melting furnace at a given level which is simply illustrated as follows:



JP '722 does not disclose a second step of adding magnesium starting material comprising Mg or Mg<sub>2</sub>Ni to the melt of REM-Ni alloy and keeping a pressure inside the melting furnace at a given level to obtain a melt of Mg-REM-Ni alloy.

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b. The present invention discloses the method of obtaining the desired compound alloy of high precision by melting Mg have high vapor pressure and a metal having a higher melting point than Mg. In contrast, JP '722 includes the premise that the corresponding alloy, i.e. REM-Mg alloy, already exists and does not provide disclosure how to obtain this alloy.

c. Regarding the pressure in the melting furnace, JP '722 does not describe the pressure inside the furnace at the time of melting, but described examples of melting of the rare earth-Mg system alloy that molten raw material is thrown in a crucible, and after carrying out full evacuation of the inside of a melting furnace, argon gas is introduced to 0.1 MPa (750 Torr) in the furnace for dissolution. That is, JP '722 does not carry out melting under vacuum but under pressure of 0.1 MPa (750 Torr). When Mg is melted under pressure of 0.1 MPa (750 Torr), as understood from Fig. 1 of the specification of the present application, a molten bath temperature becomes not less than 1500°C and cannot prevent transpiration of Mg.

*Examiner's responses are as follows:*

a. The amendment to instant claim 1 "the magnesium starting material comprising Mg or Mg<sub>2</sub>Ni" is open-ended and does not exclude additional, unrecited elements. See MPEP 2111.03. Therefore, the Mg starting material of JP '722 of a REM-Mg alloy still reads on instant claim 1. The new instant claims 9 – 15 limit the Mg starting material to Mg only and the new instant claims 16 – 20 limit the Mg starting material to Mg<sub>2</sub>Ni only. However, these new claims are



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also rejected as being unpatentable over JP '722 as discussed in the above rejections of claims 9 – 20.

b. The instant claims do not recite the limitation of obtaining the desired compound alloy of high precision by melting Mg which has high vapor pressure and a metal having a higher melting point than Mg and therefore JP '722 is not required to teach this limitation.

c. In regards to the pressure of the furnace of JP '722, the Examiner set forth her position above. JP '722 does not specifically teach that the pressure inside the melting furnace after the addition of the magnesium starting material is kept at a pressure of 350-500 Torr. However, [0027]-[0033] of JP '722 teach that the furnace is maintained in a vacuum state. Then, argon gas is introduced into the furnace in order to control evaporation of Mg. JP '722 teaches that an argon pressure of 0.1 MPa (750 Torr) is preferred. However, the pressure inside the melting furnace after the addition of the magnesium starting material is a result effective variable in terms of controlling the evaporation of Mg. Therefore, it would have been obvious to one of ordinary skill in the art to optimize the pressure inside the melting furnace after the addition of the magnesium starting material through routine experimentation in order to control the evaporation of Mg to a desired level. See MPEP 2144.05 II B. Furthermore, Fig. 1 of the instant specification does not clearly show that a molten bath temperature not less than 1500°C cannot prevent transpiration of Mg. Fig. 1 only displays the relationship between pressure inside the furnace and temperature of the melt. Therefore,

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Applicant has not demonstrated the criticality of the pressure inside the melting furnace.

***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAITLIN FOGARTY whose telephone number is (571)270-3589. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/  
Supervisory Patent Examiner, Art  
Unit 1793

CF

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